HELIFLU™ CTA

User's Manual

FAURE HERMAN

Mastering the Flow

Part of the Liquid Controls Group
A Unit of IDEX Corporation

IDEX CORPORATION

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General contents

Note: The detailed contents are inserted on the end of manual

FAURE HERMAN

Mastering the Flow

www.faureherman.com

Recommendations ATEX

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FR Recommandations ATEX

Cet équipement est certifié ATEX et conforme aux exigences essentielles en ce qui concerne la sécurité et la santé pour la conception et la construction d'appareils destinés à être utilisés en atmosphères explosibles (Directive 94/9/CE).

Pour une utilisation en toute sécurité, assurez-vous que l'équipement est utilisé conformément aux indications définies dans le certificat ATEX et la plaque d'identification, et respectez les manuels d'utilisation, d'installation et de maintenance de l'équipement et des sous ensembles qui le composent.

L'installation, l'utilisation et la maintenance doivent être réalisées par un personnel formé et spécialisé comprenant l'une des langues du manuel.

S'il vous manque un manuel ou pour toute information, contactez le service Après-vente de FAURE HERMAN :

FAURE HERMAN
Route de Bonnétable – 72400 LA FERTE BERNARD
☎ +33 (0)2 43 60 28 80 - 🖷 +33 (0)2 43 60 28 89
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EN ATEX recommendations

This equipment is ATEX certified and complies with the essential Health and Safety requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres (94/9/EC Directive).

On safety grounds, please ensure that this equipment is used in total compliance with the instructions given on the ATEX certificate and nameplate. Please consult the user manuals, equipment installation and maintenance manuals and the various parts used in this device.

This item of equipment must be installed and serviced by trained, specialist staff who understand one of the languages used in the manual.

If you require a manual or any additional information, please contact the FAURE HERMAN After Sales team:

FAURE HERMAN
Route de Bonnétable – 72400 LA FERTE BERNARD
☎ +33 (0)2 43 60 28 80 - 🖷 +33 (0)2 43 60 28 89
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ES Recomendaciones ATEX

Este equipo certificado ATEX cumple con los requisitos esenciales relativos a la seguridad y la salud en el diseño y la construcción del material utilizable en atmósferas potencialmente explosivas (Directiva 94/9/CE).

Para un uso seguro, compruebe que el equipo se utiliza según las indicaciones descritas en el certificado ATEX y la placa de identificación, y respete los manuales de utilización, de instalación y de mantenimiento del equipo y de los elementos que lo componen.

La instalación, utilización y el mantenimiento deben efectuarse por un personal cualificado que entienda por lo menos uno de los idiomas del manual.

Si le falta un manual o para cualquier información, contacte con el servicio de postventa de FAURE HERMAN:

FAURE HERMAN
Route de Bonnétable – 72400 LA FERTE BERNARD
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IT Raccomandazioni ATEX

La presente apparecchiatura è certificata ATEX e conforme alle esigenze essenziali nell'ambito della sicurezza e la salute per la concezione e la costruzione d'apparecchi destinati a essere utilizzati in atmosfere potenzialmente esplosive (Direttiva 94/9/CE).

Per un utilizzo altamente sicuro, accertatevi che l'apparecchiatura sia usata conformemente alle indicazioni fornite nel certificato ATEX e nella piastra d'identificazione; rispettate i manuali d'utilizzo, installazione e manutenzione dell'apparecchiatura e dei sottoinsiemi che la compongono.

L'installazione, l'utilizzo e la manutenzione vanno effettuati da un personale formato e specializzato, edotto di una delle lingue del manuale.

Se vi manca un manuale o per qualsiasi informazione, contattate il Servizio Clientela di FAURE HERMAN:

FAURE HERMAN
Route de Bonnétable – 72400 LA FERTE BERNARD
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DA ATEX anbefalinger

Dette udstyr er ATEX-certificeret og overholder de væsentlige sundheds- og sikkerhedsmæssige krav til design og konstruktion af apparater, der er beregnet til anvendelse i eksplosive atmosfærer (Direktiv 94/9/EF).

For en sikker anvendelse bør De sørge for, at udstyret anvendes i henhold til de forskrifter, der er defineret i ATEX-certifikatet og på identifikationsskiltet, og at bruger-, installations- og vedligeholdelsesvejledningerne for udstyret og de underenheder, det er sammensat af, overholdes.

Installationen, anvendelsen og vedligeholdelsen skal foretages af specialuddannet personale, som forstår et af de sprog, manualerne er udfærdiget på.

Hvis De mangler en manual eller for enhver anden information, kontakt venligst FAURE HERMAN's Serviceafdeling:

FAURE HERMAN
Route de Bonnétable – 72400 LA FERTE BERNARD
☎ +33 (0)2 43 60 28 80 - 🖷 +33 (0)2 43 60 28 89
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SV ATEX rekommendationer

Denna utrustning är certifierad enligt ATEX och uppfyller de väsentliga kraven i fråga om säkerhet och hälsa vid utformning och tillverkning av apparater som är avsedda för användning i explosionsfarliga omgivningar (Direktiv 94/9/EG).

För en fullt säker användning, se till att utrustningen används i överensstämmelse med de anvisningar som figurerar i ATEX-certifikatet samt på identifikationsskylten, och följ instruktionsböckerna för användning, installation och underhåll av utrustningen och dess ingående underenheter.

Installationen, användningen och underhållet skall utföras av personal som är utbildad, specialiserad och som förstår något av instruktionsbokens språk.

Om du saknar någon av instruktionsböckerna eller för all annan information, kontakta FAURE HERMANs kundservice:

FAURE HERMAN
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FAURE HERMAN

NO ATEX anbefalinger

Dette utstyret er ATEX-sertifisert og oppfyller hovedkravene når det gjelder hensyn til sikkerhet og helse ved utforming og konstruksjon av utstyr til bruk i eksplosjonsfarlige omgivelser (Europaparlaments- og Rådsdirektiv 94/9/EF).

For full sikkerhet må det kontrolleres at utstyret benyttes i samsvar med anvisningene i ATEX-sertifikatet og på merkeplaten. Instruksjonene i brukerhåndboker samt installasjons- og vedlikeholdsanvisninger for utstyret og delene det består av, må følges omhyggelig.

Installasjon, bruk og vedlikehold må utføres av spesialisert, faglært personell som forstår et av språkene i håndbokene.

Hvis det mangler en håndbok eller hvis du trenger ytterligere opplysninger, vennligst ta kontakt med serviceavdelingen i FAURE HERMAN:

FAURE HERMAN
Route de Bonnétable – 72400 LA FERTE BERNARD
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PL Zalecenia ATEX

Niniejsze wyposażenie posiada certyfikat ATEX i jest zgodne z podstawowymi wymaganiami dotyczącymi bezpieczeństwa i higieny odnoszącymi się do projektu i budowy urządzeń przeznaczonych do użytkowania w przestrzeniach zagrożonych wybuchem (Dyrektywa 94/9/WE).

W celu zapewnienia bezpiecznego użytkowania, należy upewnić się, że wyposażenie jest używane zgodnie z zaleceniami podanymi w certyfikacie ATEX i na tabliczce znamionowej oraz należy przestrzegać zaleceń instrukcji obsługi, instalacji i konserwacji wyposażenia i jego podzespołów.

Instalacja, użytkowanie i konserwacja muszą być realizowane przez przeszkolony i wyspecjalizowany personel korzystający z dokumentacji przygotowanej w języku, jakim się posługuje.

W przypadku braku dostępu do danego podręcznika lub informacji, prosimy o skontaktowanie się z działem obsługi po sprzedaży FAURE HERMAN:

FAURE HERMAN
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PT Recomendações ATEX

Este equipamento é certificado ATEX e está conforme às exigências essenciais no que concerne a segurança e a saúde para a concepção e a construção de aparelhos destinados a serem utilizados em atmosferas potencialmente explosivas. (Directiva 94/9/CE).

Para uma utilização com total segurança, assegure-se de que o equipamento é utilizado de acordo com as indicações definidas no certificado ATEX e na placa de identificação, e respeite os manuais de utilização, de instalação e de manutenção do equipamento e dos subconjuntos que o compõem.

A instalação, a utilização e a manutenção devem ser realizadas por um pessoal formado e especializado que compreenda uma das línguas do manual.

Se faltar-lhe um manual ou para quaisquer informações, entre em contacto com o Serviço Após-Venda da FAURE HERMAN:

FAURE HERMAN
Route de Bonnétable – 72400 LA FERTE BERNARD
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✐ services@faureherman.com

NL ATEX richtlijnen

Deze apparatuur heeft de ATEX certificering en beantwoordt aan de essentiële eisen inzake veiligheid en gezondheid voor het ontwerp en de bouw van apparaten bedoeld voor gebruik op plaatsen waar ontploffingsgevaar kan heersen (Richtlijn 94/9/EG).

Voor een veilig gebruik dient u te controleren of de apparatuur gebruikt wordt volgens de in het ATEX certificaat vermelde aanwijzingen en op het kenplaatje en de gebruiks-, installatie- en onderhoudshandleidingen van de apparatuur en de samenstellende onderdelen in acht te nemen.

De apparatuur moet geïnstalleerd, gebruikt en onderhouden worden door speciaal hiervoor opgeleid personeel dat minstens één van de talen van de handleiding begrijpt.

Indien een handleiding ontbreekt of u aanvullende informatie nodig heeft, neem dan contact op met de servicedienst van FAURE HERMAN:

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✐ services@faureherman.com

DE ATEX Empfehlungen

Dieses Gerät ist ATEX-zertifiziert und entspricht den grundlegenden Sicherheits- und Gesundheitsanforderungen an Konstruktion und Bau für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen (Richtlinie 94/9/EG).

Für eine sichere Anwendung muss das Gerät gemäß den Angaben im ATEX-Zertifikat und dem Typenschild verwendet werden. Berücksichtigen Sie die Gebrauchs-, Installations- und Wartungshandbücher des Geräts und dessen Komponenten.

Installation, Gebrauch und Wartung müssen von spezialisiertem Fachpersonal durchgeführt werden, die eine der Handbuchsprachen verstehen.

Wenn Sie ein Handbuch oder weitere Informationen benötigen, wenden Sie sich bitte an den FAURE HERMAN-Kundendienst

FAURE HERMAN
Route de Bonnétable – 72400 LA FERTE BERNARD
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FI ATEX-Suositukset

Tämä laite on ATEX-varmennettu ja vastaa turvallisuutta ja terveyttä koskevia oleellisia vaatimuksia koskien räjähdysvaarallisissa tiloissa käytettäväksi tarkoitettujen laitteiden suunnittelua ja valmistusta (Direktiivi 94/9/EY).

Turvallisuussyistä teidän tulee varmistaa, että laitetta käytetään ATEX-sertifikaatissa ja tunnistuslaatassa määriteltyjen ohjeiden mukaisesti ja teidän tulee noudattaa laitteen käyttö-, asentamis- ja huolto-ohjeita sekä laitteen että sen muodostamien osien ollessa kyseessä.

Asentamisen, käytön ja huollon saa toteuttaa ainoastaan koulutettu ja erikoistunut henkilökunta, joka ymmärtää jotain käyttöohjeissa käytettyä kieltä.

Jos teillä ei ole käyttöohjeita tai haluatte lisätietoja, ottakaa yhteyttä myynninjälkeishuoltoon FAURE HERMAN:

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FAURE HERMAN

EL

Συστάσεις περί ATEX

Ο παρών εξοπλισμός έχει πιστοποιηθεί ως ATEX και συμμορφώνεται με τις βασικές απαιτήσεις για την ασφάλεια και την υγεία σχετικά με το σχεδιασμό και την κατασκευή συσκευών που προορίζονται για χρήση σε εκρήξιμες ατμόσφαιρες (Οδηγία 94/9/ΕΚ).

Για λόγους ασφαλείας, βεβαιωθείτε ότι ο εξοπλισμός χρησιμοποιείται σύμφωνα με τις οδηγίες που δίνονται στο πιστοποιητικό ATEX και την πλακέτα αναγνώρισης και τηρήστε τις οδηγίες των εγχειριδίων χρήσης, εγκατάστασης και συντήρησης του εξοπλισμού και των υποσυνόλων που αποτελούν τον εξοπλισμό αυτό.

Η εγκατάσταση, η χρήση και η συντήρηση πρέπει να πραγματοποιούνται από καταρτισμένο και ειδικευμένο προσωπικό που κατανοεί μία από τις γλώσσες του εγχειριδίου.

Εάν χρειάζεστε κάποιο εγχειρίδιο ή για οποιαδήποτε άλλη πληροφορία, επικοινωνήστε με το Τμήμα Εξυπηρέτησης μετά την Πώληση της εταιρείας FAURE HERMAN:

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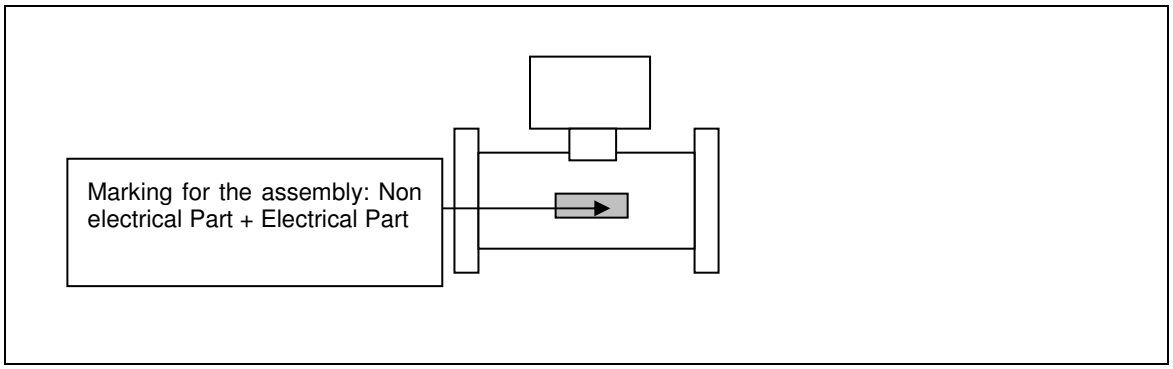
This equipment is an assembly of a non electrical part and an electrical part which are both ATEX certified relating to the design and construction of equipment intended for use in potentially explosive atmospheres (94/9/CE directive).

General:

For safety utilization, be sure that you use this equipment in totally compliance with its ATEX certificate and nameplates indications, and respect the installation, maintenance and user's manuals of the equipment and its different parts.



This equipment is suitable in hazardous area complying with its protection system and the indications specified on its nameplates.

Electrical power must be "OFF" before and during Installation and Maintenance.

This equipment shall be handled with the greatest care and mounted in a location to avoid possible shocks.

Installation and Maintenance operation shall be done by means of suitable tools. Never use a hammer, impact wrench or any tools which can make sparks or damage the equipment protection system.

If this equipment is supposed to be connected to other devices, verify that the protection systems are compatible.

Installation, maintenance and repairs of this equipment shall be carried out by suitably trained personnel and the spare parts shall be approved by FAURE HERMAN.

No operations or repairs which can affect the protective system could be done on this equipment without FAURE HERMAN agreement.

For specifically installation and maintenance advices, contact FAURE HERMAN After Sales Department

FAURE HERMAN
Route de Bonnétable – 72400 LA FERTE BERNARD
Tel : +33 (0)2 43 60 28 80
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E-mail: fhservices@idexcorp.com

For any contacts, **Don't forget to give us your equipment serial number.**

Unit protective system:

The Unit certification is defined under the certificate number ***LCIE 05 ATEX 6059X***. This equipment is manufactured with a construction protective system for the non electrical part and an intrinsically safe protective system for the electrical part.

This equipment as a unit can be used in an II 2 G potentially explosive atmospheres (gas on surface in a zone 1) with a IIB gas group.

Marking of the equipment as a unit shall include the following ATEX indications:

Marking	Description
FAURE HERMAN	**Company name**
BP20154 - 72406 La Ferté Bernard	**Company address**
Made in France	
Equipment :	**Model**
S/N…	**Serial number**
Year	**Manufacturing year**
CE	**CE Logo**
LCIE 05 ATEX 6059 X	**ATEX agreement number**
	ATEX marking
II 1/2 G	**Equipment category**
EEx ia IIB T4	**Protection type and Temperature classification (electrical part)**
c T6	**Protection type and Temperature classification (Non electrical part)**

The equipment can also carry the usual marking required by the manufacturing standards applying to such equipments.

For a safety utilization of the equipment, fluid temperature must be contained between -40°C and +60°C.

The ambient temperature must be contained between -40°C and +60°C.

The temperature classification of the unit is T4.

Non electrical part protective system:

This equipment is manufactured with a construction protective system in accordance with the European standards NF EN 13463-1 and NF EN 13463-5.

Electrical part protective system:

The electrical part certification is defined under the certificate number ***INERIS 04 ATEX 0012X***.

The electrical part of this equipment is an autonomous counting electronics with an intrinsically safe protective system ("ia") in accordance with the European standards NF 60079-0, NF 60079-11.

This autonomous electronic is supplied with a lithium cell of a maximum voltage of 3,6 Volts. This cell must be as following:

Manufacturer: TADIRAN
Reference: SL 760/SL 3,6V

For a safety utilization of the equipment, no external electrical connection shall be done.

Marking of the electrical part shall include the following ATEX indications:

Ex II 1 G
EEX ia IIB T4
Tamb. -40°C to +60°C

The temperature classification of the electrical part in every situations, even with failures, is T4 (Surface temperature < 135°C) with an ambient temperature between -40°C and +60°C.

Cell replacement is not allowed in presence of potentially explosive atmospheres. For any operations.on the electrical part, you shall consult its user's manual defined as the following: ***Electronic Volume Indicator/Totalizer Device FH1200 – TEC 06-09-02***.

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Chapter 1: Introduction

CTA family

Turbine flowmeters of the CTA family are essentially designed to measure volumes of liquids of medium viscosity during fuelling or re-fuelling operations.

The CTA meter is an autonomous instrument, designed to be installed at the end of a flexible fuelling hose and straight upstream from a fuelling gun.

It consists of a turbine bi-directional flowmeter and of a metering electronics, integrated in the cover associated to the meter body. The volume displayed can be directly read out by the operator through a display window fastened to the enclosure thickness. The display unit backlighting enables the meter use by night.

- The optimum operating flow range is comprised betweento → 0,6 to 6m³/hto → 1,2 to 12m³/hto → 2 to 20m³/h
- to DS→ 0,6 to 6m³/h40to4004 DS → 2.4 to 24m³/h
- 50 to 500 l/min (CTA 100-30 → 3 to 30m³/h
- 133 to 1330 l/min (CTA 100-80 → 8 to 80m³/h
- 166 to 1660 l/min (CTA 100-100 → 10 to 100m³/h

10 and 100 l/mn. The higher limit can be exceeded temporarily without reaching 120% of the set value.

Their simple and robust construction allows to obtain a very good accuracy and excellent measurement repeatability for numerous applications.

The operating principle for this flowmeter type rests on the rotational velocity of a helical bladed impeller, positioned at the middle point of the piping, by means of an assembly made of

magnets (fitted in the flowmeter body) and a coil (positioned in the flowmeter body).

Measuring the electrical signal frequency generated allows to calculate the liquid flow rate flowing into the pipe by means of the following expression:

$$Q = \frac{F}{K} \times 60$$

Where Q Instantaneous flow rate (l/min)

F Signal frequency (Hz)

K Measuring sub-assembly factor, determined and recorded during factory (p/l)

Metering pulses generated by the coil enables to calculate the volume flowed through two given instants by means of the following formula:

$$V = \frac{N}{K}$$

Where V Volume (l)

N Number of totalized pulses

K Measuring sub-assembly factor, determined and recorded during factory (p/l)

Characteristics

Metrological characteristics

The metering accuracy is conditioned on the measured fluid viscosity, ranging from 1 to 25 cSt. For a flow range from 10 and 100 l/mn, the maximum error is below:

CTA 20: ± 1 % up to 10 cSt & ± 2 % up to 25 cSt

CTA 100: ± 0.5 % up to 10 cSt & ± 1 % up to 25 cSt

The repeatability in the viscosity range from 1 to 25 cSt and for a flow range (l/min) from 10 and 100 l/mn is the following: 0.02%.

Main technical characteristics

Model	:	CTA
Maximum operating pressure	:	16 bar
Operating temperature	:	- 40°C to + 60 °C
Storage temperature	:	- 40°C to + 60°C
Body length (alone)	:	CTA 20 : 178 mm / CTA 100 : 253.5 mm
Height	:	CTA 20 : 94 mm / CTA 100 : 137 mm
Upstream connection	:	CTA 20 : 1" ¼ female BSP CTA 100 : 2" ½ female BSP or 2" ½ female NPT
Downstream connection	:	CTA 20 : 1" ¼ male BSP CTA 100 : 2" ½ male BSP or 2" ½ male NPT
Meter weight	:	CTA 20 ≈ 1.60 kg / CTA 100 ≈ 2.50 kg
Weather-proof cover	:	IP 66
Display unit	:	2-line display unit (5 digits and 7 digits), low battery indication, Batch/Total indication and units.
Display	:	Volume in litre, flow rate in l/mn (other in option). Low battery indication (metering electronics)
Lighting	:	Display unit back-lighting
Power supply	:	Lithium cell TADIRAN type SL760/S (3.6 V)

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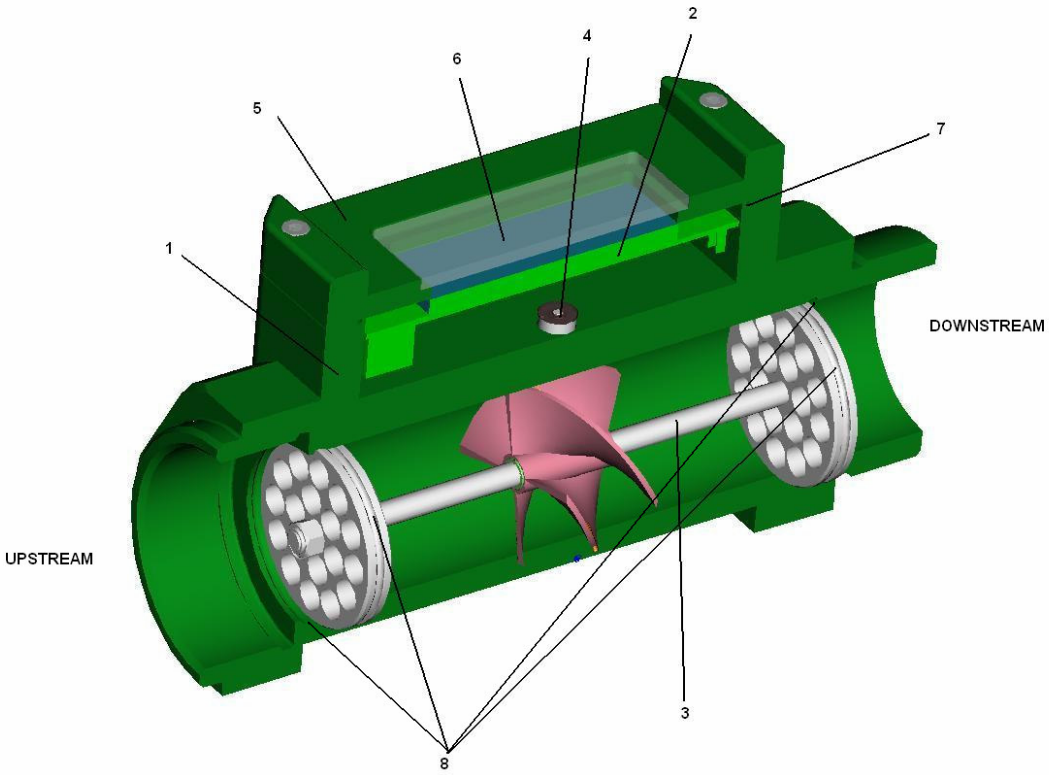
Chapter 2: Description

The CTA is made of the following main elements (Figure n°1):



Item			Item		
1	:	Meter body	5	:	Front panel
2	:	Metering electronics / display unit	6	:	Display window
3	:	Measuring sub-assembly	7	:	Front face / body gasket
4	:	Detection coil	8	:	Measuring sub-assembly gasket and fastening ring

Body

The meter body (1) is a monoblock machining part, made of Aluminium alloy.

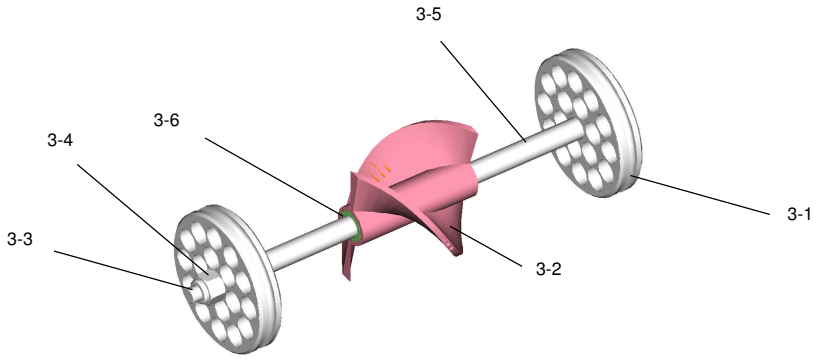
The measuring chamber internal geometry enables to position the measuring sub-assembly (3) secured by means of the ring and gasket assembly (8).

The body is connected by means of two 2" ½ BSP or 2" ½ NPT, female upstream and male downstream. In order to avoid jamming problems during assembly and disassembly of the meter, threads are specially treated with grease.

Outside from the body, a manufacturer name plate enables the equipment identification and indicates the fluid flow direction.

Measuring sub-assembly

This measuring sub-assembly (3) includes the elements contributing to the correct operation of the measuring element (impeller). It consists of the following elements (Figure n°2):



Item		
3- 1	:	Upstream and downstream perforated plate
3- 2	:	Helicoidal impeller (bi-directional)
3- 3	:	Shaft
3- 4	:	Double nut support
3- 5	:	Spacer
3- 6	:	Deep groove bearing

The totality of parts enables the correct axial positioning of the impeller into the body and enables to secure the bearing support cross pieces.

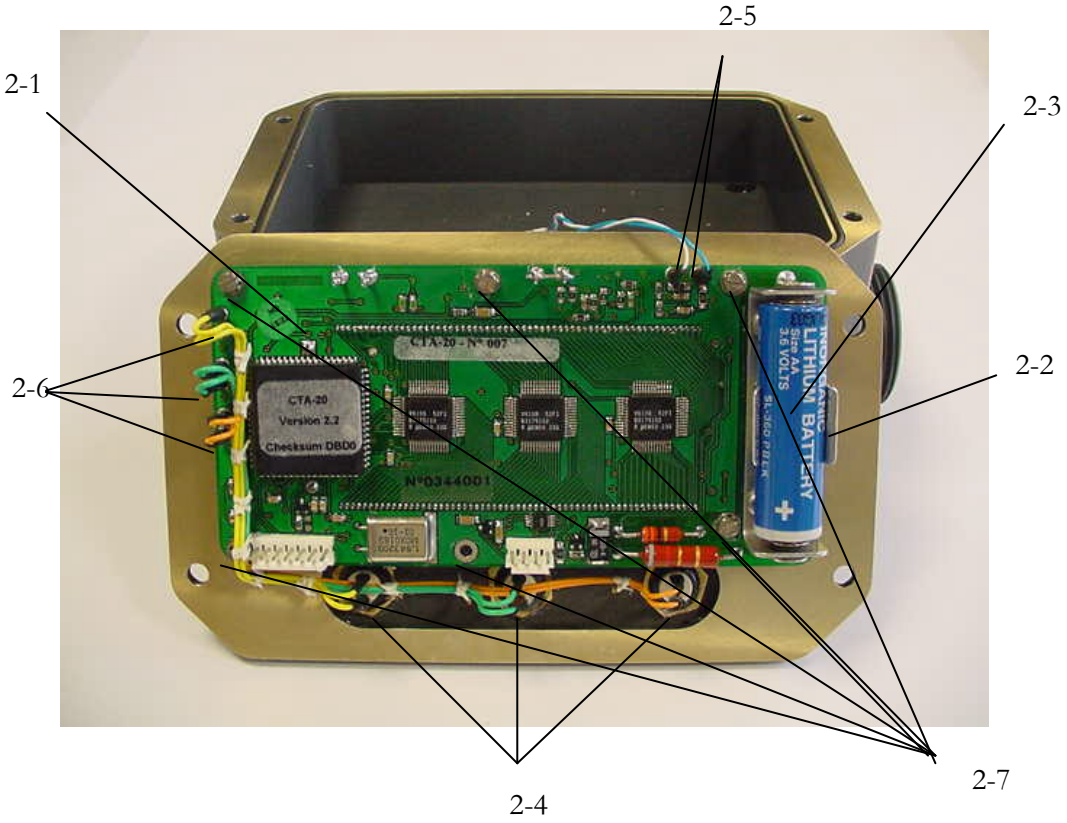
The helicoidal bladed impeller is fitted with magnets enabling to generate electrical pulses through the detection system. An arrow engraved on the impeller indicates the direct flow direction

Detection sub-assembly

One coil (4), positioned under the cover, housed and glued in a bore machined into the meter body enables the detection. It is connected to the metering electronics by means of soldering terminals.

Metering electronics

The metering electronics consists of the following main elements (Figure n°3):



One coil (4), positioned under the cover, housed and glued in a bore machined into the meter body enables the detection. It is connected to the metering electronics by means of soldering terminals.

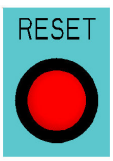
Item			Item		
2- 1	:	Printed circuit board	2- 5	:	Coil connections
2- 2	:	Cell support	2- 6	:	Push-button connections
2- 3	:	Cell	2 - 7		Fastening screws
2- 4	:	Push-buttons			

The metering electronic is fastened to the front panel (item 5, figure 1) by means of six screws (2 – 7).

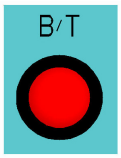
The electronic board (2-1) supports the display unit and its lighting circuit, located on the opposite side of the visible face on Figure 3.

Push-buttons

Displaying the batch and total volume, resetting the totalizer and lighting the display window is quite easy, by means of the three push-buttons (2-4) positioned on the front face.



: batch volume reset push-button



: batch / total volume switching push-button

: lighting push-button

Power supply cell

Type of cell	Lithium – ion
Model	Manufacturer: TADIRAN Reference: SL 760/SL 3,6V
Autonomy	5 000 h for 8 operating hours per day 60 months max without display
Replacement	In workshop

Chapter 3: Equipment reception and storage

When receiving the equipment, check the correct condition of packing in order to identify any possible damage inflicted during transportation.

Withdraw the meter from its packing and check its correct condition and make sure the technical manual and calibration certificate accompany the goods. Should the product be damaged and documents omitted, please contact the FAURE HERMAN After-Sales Department:

Plant La Ferté Bernard
Route de Bonnétable
72400 LA FERTE BERNARD
Tel: 33 (0) 2 43 60 28 80
Fax: 33 (0) 2 43 60 28 89
E-mail: fhservices@idexcorp.com

Before commissioning the equipment, it is recommended to keep it in its original packing, sheltered from strict climatic conditions and possible shocks. The equipment shall be stored in a clean and dry room, the measuring channel being protected and at a temperature ranging from –40°C / +60°C.

To avoid any risk of polluting the hydraulic assembly, protections closing connections shall be kept in place. Anyway they shall only be withdrawn just before assembly.

Consumption, when the electronic circuit is in stand-by, is extremely low. Therefore, the cell can be left during long-term

storage. The low battery indicator gives indications relating to the cell discharge status.

In the event of extended storage (longer than 1 year), we recommend to check the equipment in factory before its commissioning.

Chapter 4: Operation

Instrument functions

- Batch cumulated volume totalizer (since the latest reset) and total cumulated volume totalizer (after the instrument commissioning) - (display in litres)
- Instantaneous flow rate (display in litre / minute)
- Batch totalizer manual reset to zero (RAZ)
- Lighting

Operating modes

Stand-by mode

By default, the instrument is in stand-by mode. The display unit is off and the Lithium cell consumption reduced. The partial and total volume latest values are stored in memory.

End of stand-by mode

Manual: When the operator presses rapidly an active key, the display unit becomes active. This does not mean the function associated to the key is performed. The batch or total volume latest value (according to the status of the latest selection performed before the stand-by mode of the instrument) is then displayed.

Automatic: when detecting a pulse involved by the liquid flow.

At the end of the stand-by mode, the instrument turns into the metering mode.

Stand-by mode

It is automatic after 30 seconds after the metering stop, by blocking the impeller.

Instrument in metering mode

The instrument turns automatically to the metering mode, when the fluid flows.

The totalized volume is then displayed permanently. It is incremented progressively with fuelling or refuelling.

Turning manually to the metering mode (refer to "manual end of stand-by mode") enables to display the latest batch or total volume latest value, for record purposes before Reset or to perform, as an example, an additional fuelling sequence.

Volume reset

The batch volume totalizer reset can only be performed manually, by pressing the **RESET** key. The total volume cannot be reset.

> ***Remarks**: on an instrument in stand-by mode, we recommend before resetting, to turn manually to the metering mode, so as to check the stored volume value. .*

Continuation of a loading sequence

Should the case arise, it is possible to continue a loading sequence without volume resetting:

- When the instrument did not turn to the stand-by mode, just let anew flow the liquid, thus the volume will increase from the last totalized value.
- When the instrument is in stand-by mode, it turns automatically to the metering mode, once the liquid flows. However turning manually to the metering mode is not recommended, so as to check the value of the latest volume stored.

Display unit lighting

The display unit lighting becomes active when the operator presses the **LIGHT** button. The lighting delay time is 10 seconds.

Remark: *The display unit lighting is wholly independent from the device two operating modes.*

Batch volume total volume switching

Data displayed on the second line is, either the total volume **T**, or the batch volume **B** (after the last resetting operation). The **B/T** button is used for the selection.

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Chapter 5: Installation conditions

The general installation conditions of turbine meters type CTA shall meet some requirements to guarantee the equipment reliability and accurate measurements, repeatable in time.

The meter life time together with the measurement reliability can be reduced by presence of gas and/or solid particles in the flowing liquid.

Presence of gas, in the form of bubbles or emulsion would involve a significant deterioration of performances, whereas the passage of gas "pockets" between two liquid sections might generate the destruction of the impeller pivot system involving serious measurement errors. Make sure there is no gas injection risk upstream from the measurement section and make sure there is a draining or degassing system provided, when required, upstream from the meter.

Presence of small-sized solid particles inside of the liquid flow may involve a progressive deterioration of the meter fixed or moving elements (perforated plate, bearing support cross pieces, impeller), what would involve a progressive deterioration of performances, whereas the passage of more significant solid particles may generate definitive damages on the same elements.

It is therefore recommended to check there is no risk of solid particle injection upstream from the measurement section and to have a filter whose mesh allows the interruption of solid particles with dimensions higher than 500 µm.

Mechanical installation

When installing the meter on the pipe, make sure:

- Of the pipe cleanliness upstream from the meter,

- Of the flow element, represented by an arrow on the manufacturer's nameplate (the arrow indicates the direct direction).
- Of the correspondence between flanges and joint faces, on the pipe side and on the meter side,
- Of the meter alignment with the upstream and downstream pipes and make sure there is no obstacle preventing the correct liquid flow (joint, …),
- There is no excessive stress generated by the compensation of misaligned upstream and downstream pipes due to flange tightening,

Do not forget as for any measuring instrument, a turbine meter shall be handled with the greatest care.

Chapter 6: Commissioning

After completion of the meter mechanical installation, proceed with the installation filling.

During this operation, check the purging of gas present in the pipes, by means of available draining systems or through the flowmeter at very low flow rate.

Avoid sudden flowmeter filling, so as to prevent rapid flow of gas "pockets", which would damage the impeller pivot system.

The CTA meter does not require any special adjustment and, once installed, it is immediately available to perform a fuelling or refuelling operation.

Avoid the flowmeter extended use beyond the specified operating maximum flow rate.

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Chapter 7: Servicing

The CTA meter does not require any special servicing, when its use remains within the operating limits specified for this type.

For an application not subjected to a periodical verification, we recommend therefore to proceed with a verification of the measuring sub-assembly, at least every two year. Such verification may involve the replacement in factory of the pivot system (shafts, bearings).

The CTA meter can remain full of liquid, providing the liquid viscosity does not vary significantly in time.

In the event of extended interruption, we recommend to leave the meter full of liquid so as to avoid choking of bearings, except when the liquid can crystallize or solidify.

The list of elements which are likely to be supplied for stock or replacement is available in our After-Sales Department.

Current servicing

The instrument requires a servicing mainly because of the operating conditions (cleanliness and filtration level of the measured fluid).

In the event of unexplained shift of the measurement, check the status of:

- Upstream and downstream perforated plates,
- The instrument moving parts.

Should the case arise, clean the involved parts with the greatest care.

⚠ : **Never use vapour or compressed air to drive into rotation or dry the meter moving parts, because of the impeller excessive over-speed risks.**

Cell replacement

The autonomy of the power supply cell of the metering electronics circuit is conditioned on its use.

Its replacement shall occur when the low battery indication is displayed ( )

This operation requires the cover disassembly (2-1). It shall be carried out in workshop (refer to Figure 3):

- - Wait until the meter is in standby mode.
- - Place the instrument on a table or a clear support,
- - Unscrew the 4 screws securing the cover (2-1) to the instrument body,
- - Withdraw the used cell and install the new one, while respecting the polarities,
- - Re-install the cover (2-1) to the instrument body, while taking care to avoid crushing the wires of the coil or gas detector and to position the gasket (2-5).

⚠ : Replace imperatively the power supply cell by a cell of TADIRAN type LF 360. For some cells, the low battery indication may appear. This event is quite normal and disappears after some operating hours.

⚠ : After the first display of low battery indication, its replacement shall occur rapidly, since its autonomy is limited to approximately 200 hours (besides lighting), before the instrument cannot be used.

Chapter 8: Dysfunctions

Problem	Possible cause
The meter overrates	1 – 2 – 5 - 7 – 8 – 9 – 10 - 11
The meter underrates	1 – 2 – 3 - 4 – 5 – 6 – 8 – 9 – 10 – 11
Erratic indications	1 – 2 – 8 – 9 – 10 – 11
No signal	2 – 3 – 4 – 6

Possible cause		Corrections
1	Disturbing pulses	Check wiring Check and replace when required the coil(s).
2	Coil defect	Check wiring Check and replace when required the coil(s).
3	Magnetization loss	Replace the measuring sub-assembly.
4	Damaged pivot system	Replace the measuring sub-assembly.
5	Damaged impeller	Replace the measuring sub-assembly.
6	Blocked impeller	Clean the measuring sub-assembly Replace the measuring sub-assembly.
7	Deposits on the internal walls	Clean the measuring sub-assembly. Check the installation conditions. Check the totality of upstream elements. Replace the measuring sub-assembly.

8	Deformation of the flow profile	Check the installation conditions. Check the totality of upstream elements. Repair / clean the perforated plates. Clean the measuring sub-assembly.
9	Presence of gas in the flow	Eliminate the source. Check the totality of upstream elements. Install a de-aerator.
10	Cavitation	Check the installation conditions. Check the totality of upstream elements. Repair / clean the perforated plates. Increase the line pressure.
11	Calibration problem	Replace the measuring sub-assembly.

Chapter 9: Analysis of pressure related risks

The analysis of dangerous phenomena, derived from solicitations to which the equipment can be submitted when installed and used in reasonably foreseeable operating conditions, show the following points:

- There is no risk, in the sense of a dangerous phenomenon, related to the possible rupture of an internal element or component.
- The equipment design and overall dimensions comply with the state-of-the-art rules and equipment category calculation code (CODAP). Within this framework, using the equipment in reasonably foreseeable operating conditions do not allow to contemplate any risk, in the sense of a dangerous phenomenon.
- The operating restrictions and specific installation and implementation recommendations enabling to guarantee this absence of risk are specified in Appendix 1.

> *Remark: Equipment disassembly*
> *By definition, the equipment is designed to operate under fluid pressure. Allowing for the potential danger these fluids represent, the equipment shall be imperatively and completely drained, before disassembling the equipment (complete disassembly or removal of a component under pressure).*

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Appendix 1

Operating restrictions – Special recommendations

The equipment nominal operating field is specified on its nameplate. This field is mainly defined in terms of:

- Maximum – Flowrate
- Minimum/Maximum – Temperature

The flowrate restrictions specify the equipment optimal performance field (measurement accuracy and repeatability). The maximum value sets also the permissible continuous operating limit, without occasionally exceeding the 120 % of the set value.

The temperature restrictions involve exclusively the equipment mechanical dimensions and define the authorized operating field.

> *Remark: When the operating temperature is higher than the indicated value the maximum authorized pressure shall be reduced, in strict application of the NF EN 1092-1 and NF EN 1759-1 Standard.*

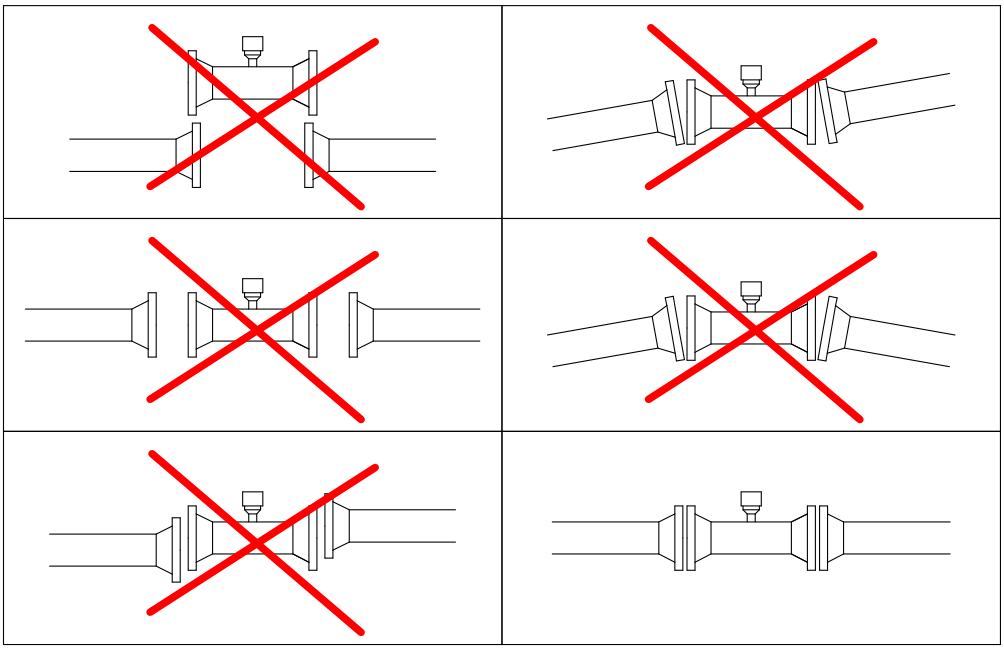
Equipment installation

Before installation, keeping the equipment in its original packing, sheltered from bad weather and possible impacts.

The equipment mechanical installation on the measurement line shall not generate excessive stresses. Especially, the alignment of upstream and downstream flanges shall allow to avoid the transmission of stresses on the equipment body.

The equipment shall be installed by means of the suitable tools.

- Never use a hammer or impact wrench.
- No equipment element is designed to contribute to the tightening of connecting rods.
- Specific tools shall be used, when necessary, for the spacing between upstream and downstream flanges.



Lifting or pre-positioning means used, when necessary, shall be kept in place until installation achievement (tightening of all connecting rods).

Check the fitting of new gaskets, adapted to the application (material) and flange size.

Equipment disassembly

By definition, the equipment is designed to operate under fluid pressure. Allowing for the potential danger these fluids represent, the equipment shall be imperatively and completely drained, before disassembling the equipment (complete disassembly or removal of a component under pressure).

Should this draining need partial de-tightening of the equipment connecting rods, check the line is perfectly de-pressurized before de-tightening and implementation of the liquid recovery tank.

Flange gaskets shall not be re-used.

Remarks:
The equipment is a measuring instrument and shall be used as such.

The equipment body of the associated components (flowstraightener, bosses …) are designed to support stresses in reasonably foreseeable operating conditions. They are not designed to be used as supports, equipment carry means or step.

Any modification brought to the equipment, susceptible to affect the pressure resistance, after delivery, is STRICTLY PROHIBITED.

For any replacement of Electronic Board, the used Electronic Board is subjected to restrictive disposal according to the ROHS standard.

The disposal of the used Electronic Board should be either sent back to Faure Herman who will take care of its disposal, or dispose by the customer according to the EPA rules of its country.

Detailed contents

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Personal notes